BUILD ELECTRONICS BETTER

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ECONOMIC OUTLOOK

Supply chain constraints continue to be the major impediment to growth for the electronics manufacturing industry. Nearly every logistics or transportation statistic points to severe supply chain dislocations. A near record number of ships remain bottled necked at the west coast ports of Long Beach and Los Angeles. As of the end of November, some 138 ships were in port but only 57 were at berth. Of these 138 ships, 78 are container ships and 51 of those are at anchor or loitering while they wait to be unloaded. Demand for trucking in the U.S. is nearly three times the normal level and trucking rates are up 50% from pre-pandemic levels. Airfreight rates are at historic highs, up 30-80% depending on the route, and it will likely take until 2024 for airfreight capacity to return to pre-pandemic levels.

Inventories remain extremely tight. Perhaps this is nowhere more apparent than in the automotive sector. Historically, the U.S. auto sector maintained an inventory-to-sales ratio of close to 2.4. In other words, in normal conditions, the auto sector could cover roughly 10 weeks of sales with inventory onhand. Today, inventory-to-sales for new vehicles is a shocking 0.389. The auto sector can barely cover 12 days of sales with current inventory levels. Sales for the year are 1.7 million vehicles below where they would have been without supply chain disruptions and I believe sales will likely be close to one million short in 2022.

Parts shortages are being compounded by higher prices. In IPC's most recent Current Sentiment of the Global Electronics Manufacturing Supply Chain report, nine-in-ten electronics manufacturers report rising material costs and nearly 80% expect prices to rise higher in the coming six months. Electronics manufacturers report that both inventories available to customers as well as inventories available from suppliers declined in the last month and the outlook for the next six months is little changed.

Manufacturers also report rising labor costs and declining ease in finding skilled workers. Overall, job openings in the U.S. are near historic highs. Initial unemployment claims declined to 199,000 the week before Thanksgiving, plunging to the lowest level since 1969. Private-sector wages and salaries rose 0.9% in October and are now up a strong 10.5% in the past year.

There is capacity to buy, among both consumers and businesses, but supply chain constraints have limited potential growth in spending and investment. Manufacturers report strong order growth, but growth is being offset by higher costs and as a result profit margins are declining.

Another major uncertainty continues to be the trajectory of COVID. There is still very little known about the omicron variant, but it poses a significant threat at a time when the economy is making a push to return to pre-pandemic patterns. Regardless of the severity of the actual variant, uncertainty surrounding the variant likely causes travel to decline and consumers and businesses to retrench somewhat. The trajectory of the economy will follow the trajectory of the pandemic.

Uncertainty surrounding the impact of any variants is compounded by the uncertainty of how governments will react. Hong Kong, as part of its zero-COVID policy, recently banned non-resident arrivals from 13 more countries due to the omicron variant. The U.S. blocked most visitors from eight African nations, but at least for now, the Federal government seems disinclined to impose new lockdown measures beyond travel restrictions.

Consumer sentiment has been mired near the low levels first recorded at the onset of the pandemic since the Delta variant became more widespread at the end of the summer. In the early weeks of November, sentiment fell further, hitting a decade low. Uncertainties surrounding COVID and potential resurgences remain high and have curtailed improvements in sentiment. While incomes are rising, higher rates of inflation are also tampering confidence. Complaints about falling living standards, as a result of inflation eroding purchasing power, doubled in the past six months and quintupled over the last year.

Despite uncertainties, supply chain disruptions have resulted in unfilled pent-up demand that should help carry growth into the first half of 2022. While we have lowered our forecast somewhat, 2022 should still be a historically strong year.

10.5%

Private-sector wages and salaries rose 0.9% in the U.S. in October and are now up a strong 10.5% in the past year.

.389

Inventory-to-sales for new vehicles has fallen to a historically low level as supply chain shortages continue to cripple production.

6.0%

Inflation hit 6% in Germany in November, the highest level in 30 years.

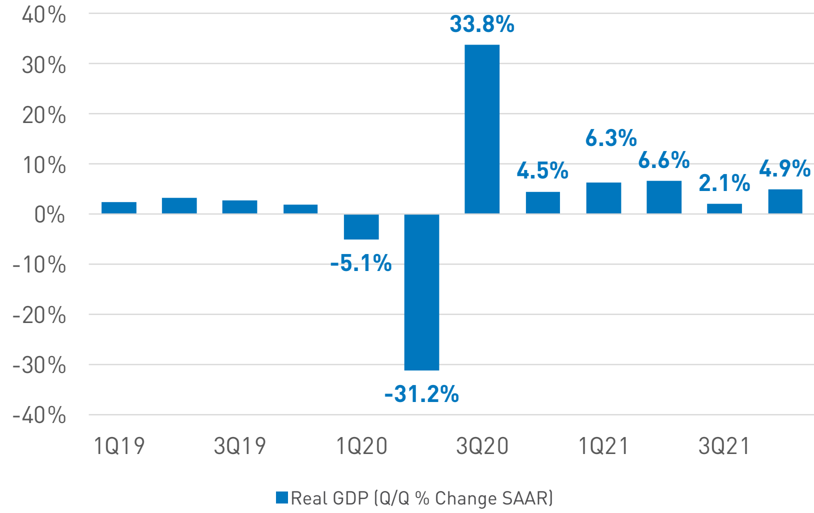
50.1

The official manufacturing Purchasing Managers' Index (PMI) for China showed expansion in November, a hopeful sign some supply chain dislocations are easing.

U.S. OUTLOOK

ECONOMIC GROWTH

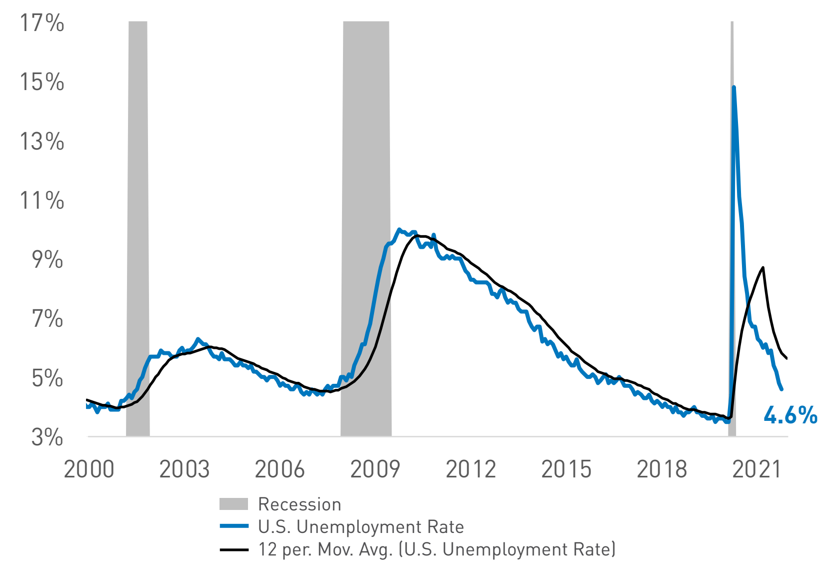
Third quarter GDP was revised up one-tenth of a percentage point to 2.1%. But this remains a steep deceleration from the 6.5% growth in the first half of 2021. The largest positive contributions to growth in the quarter were inventories and consumer spending. But consumer spending grew just 1.6% during the third quarter compared to 12% in the second quarter. Incoming data for Q4 suggests stronger growth, driven in part by international trade and inventories as companies work to rebuild depleted stock. I expect growth to accelerate to 4.9% in Q4. While my expectations for growth for 2021 and 2022 are muted from prior months, I still expect the economy to grow 4% next year. Though this is a step down from this year's expected 5.5% growth, it is still historically strong annual growth.



	2021 ECONOMIC GROWTH (GDP % Change)	2022 ECONOMIC GROWTH (GDP % Change)	2021 EXCHANGE RATE (v. USD)	2022 EXCHANGE RATE (v. USD)
UNITED STATES	5.5%	4.0%	N/A	N/A
CANADA	5.2%	4.1%	1.26	1.23
MEXICO	5.9%	3.0%	20.45	20.68
EURO AREA	5.1%	4.1%	1.17	1.20
CHINA	8.0%	5.1%	6.49	6.49

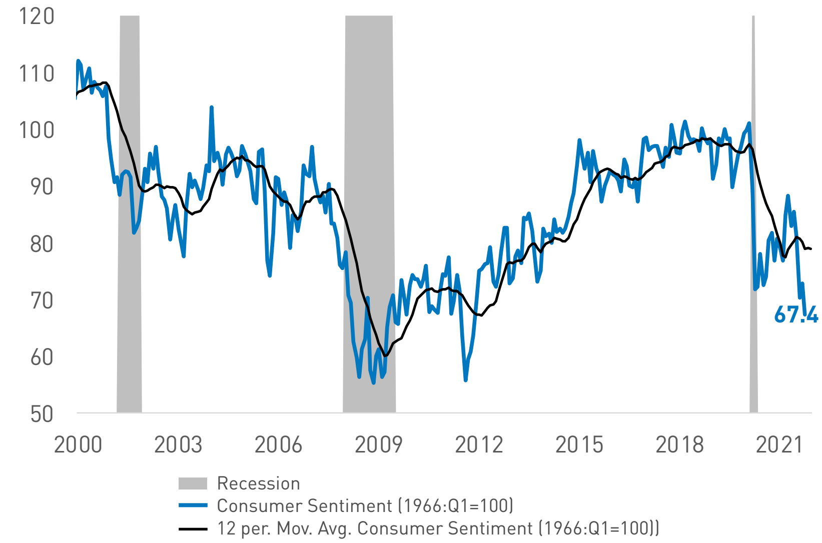
EMPLOYMENT

The U.S. labor market saw strong gains in October and upward revisions to previous months. Nonfarm payroll increased 531,000, and gains in August and September were revised higher by 235,000 jobs. The unemployment rate fell to 4.6% in October, the lowest level since March 2020. Private sector payrolls rose 604,000 during the month as hard hit sectors like hotels and restaurants added back 143,000 jobs during the month. Manufacturing added a very strong 60,000 new jobs. Manufacturing is now roughly 2% below pre-pandemic levels. Overall, workers are working longer hours and hourly earnings are higher. Average hourly earnings rose 0.4% in October and are up 4.9% over the last year. Total hours worked rose 0.2% and are up 4.2% in the last year. Combined, total worker pay, excluding irregular bonuses, is up 9.2% over the last year and 6.8% above pre-pandemic levels. Initial unemployment claims declined to 199,000 the week before Thanksgiving, plunging to the lowest level since 1969.



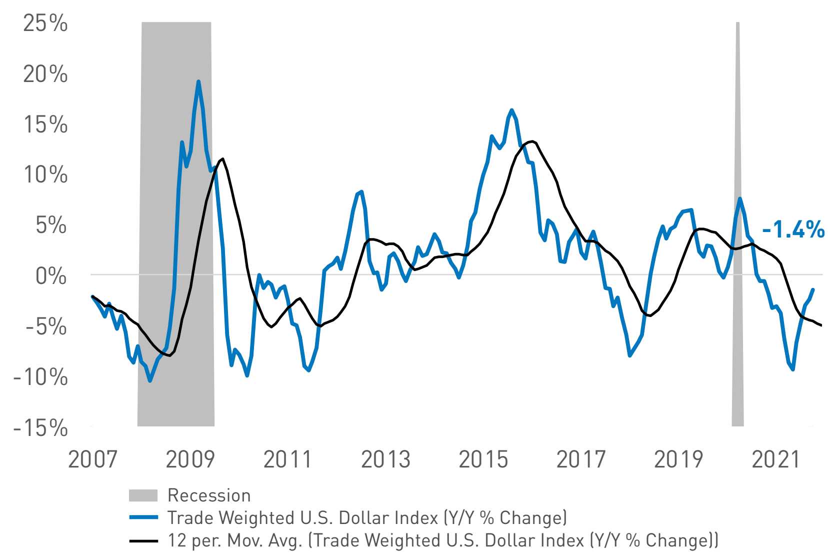
SENTIMENT

Consumer sentiment took another step down in November, reaching lows not seen in a decade. Sentiment had stepped down in August, returning to the low levels first recorded at the onset of the pandemic. Sentiment as the Delta variant raged throughout the U.S., driving COVID cases higher. But sentiment was also brought down by concerns about rising inflation, supply chain shortages, and decreasingly favorable views on current economic policy. While uncertainty about the future trajectory of COVID is continuing to exert pressure on sentiment, consumers are also expressing worry about the impact inflation will have on their own financial well-being. Complaints about falling living standards, as a result of inflation eroding purchasing power, doubled in the past six months and quintupled over the last year.



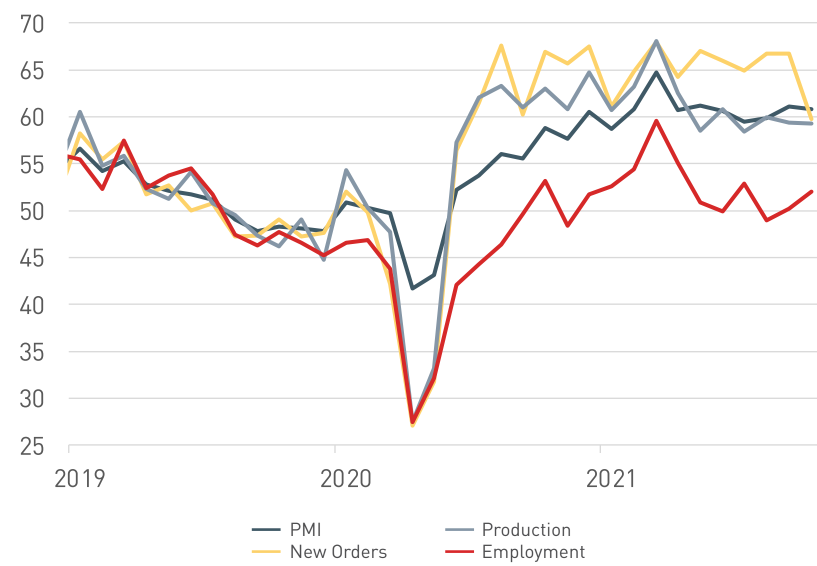
TRADE-WEIGHTED U.S. DOLLAR INDEX

The trade-weighted U.S. dollar index rose sharply in October, increasing 0.6% during the month, the fifth consecutive monthly increase. Similar to last month, this is likely the result of deteriorating global sentiment as the pandemic outlook worsened and economic activity slowed. But the dollar has also been aided by strong domestic reports for retail sales. Dollar strength has also risen on hawkish comments from the Fed in the face of rising pricing pressures. U.S. consumer prices rose at the fastest rate since 1990. Money markets are now pricing in higher probability of a rate increase in June 2022, followed by another rate hike in November 2022.



MANUFACTURERS' SENTIMENT (PMI)

The U.S. manufacturing sector expanded in October — the 17th consecutive month of growth. The October Manufacturing PMI decreased 0.3 percentage points from the prior month but continues to point to optimism. Manufacturing demand remains strong and new orders continue to grow. Ongoing supply chain challenges were evident throughout this month's ISM report, very consistent with IPC's own sentiment indices. The Backlog of Orders Index points to a rising backlog of orders. The Prices Index increased 4.5 percentage points compared to last month, hitting 85.7%. And inventories remain lean.



U.S. END MARKETS FOR ELECTRONICS

Industrial production increased 1.6% during the month and is up 5.1% over the last year. Manufacturing output rose 1.3% during the month and is up 1.6% over pre-pandemic levels. Despite severe supply chain constraints, manufacturers are working to fulfill strong order flow.

AUTOMOTIVE PRODUCTS

Auto production rose a strong 9.7% during the month, hopefully a sign that shortages and other disruptions are abating somewhat. Output is off 2.7% from pre-pandemic levels, a marked improvement from last month.

TRANSIT EQUIPMENT

Transit equipment production rose 5.3% over the last month. The sector is down 0.9% over the last year and down 24.6% from two years ago.

INFORMATION PROCESSING & RELATED EQUIPMENT

Production in the information processing and related equipment sector decreased 0.3% in the month. The sector is up 10.9% over the last year and 15.1% from two years ago.

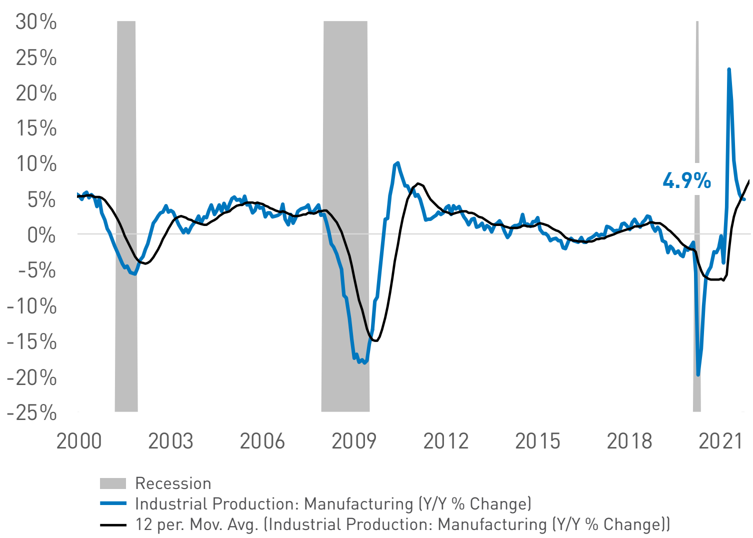
INDUSTRIAL & OTHER EQUIPMENT

The industrial sector decreased 1.9% during the last month. The sector is up 7.3% over the last year and now up 2.7% from the start of the pandemic.

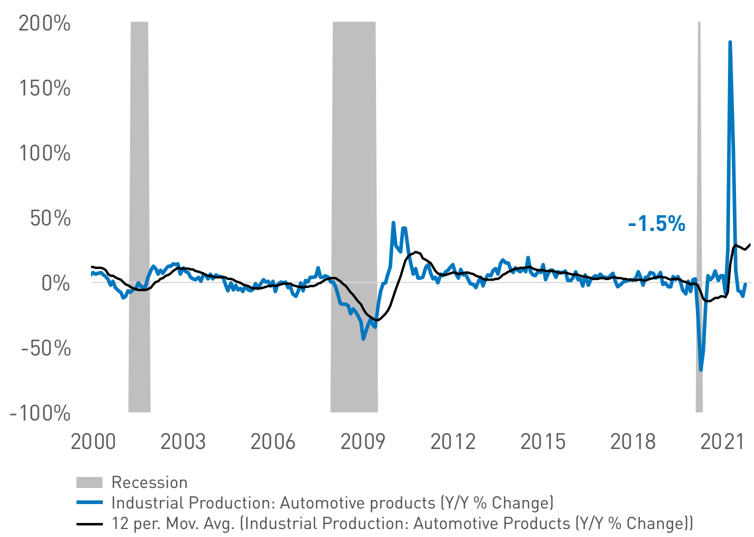
DEFENSE & SPACE EQUIPMENT

The defense and space equipment segment rose 1.7% last month. The sector is up 17% over the last year and up a strong 20.6% over the last two years.

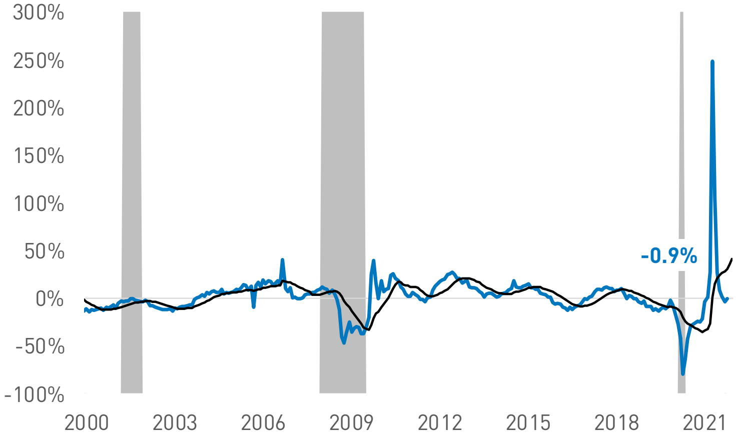
Manufacturing



Automotive Products

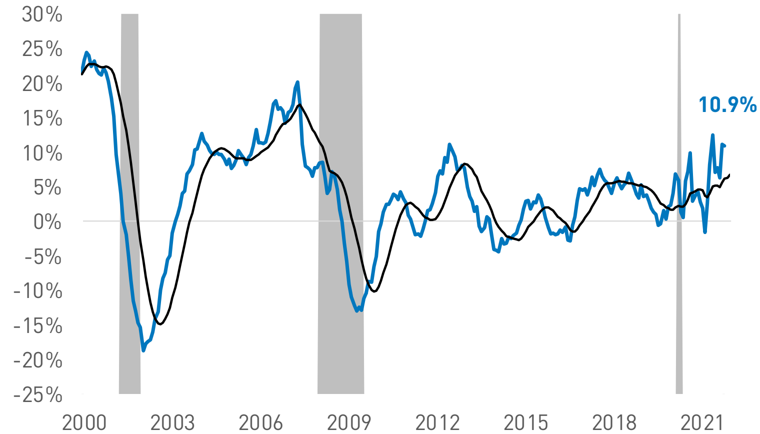


Business Transit Equipment (Y/Y % Change)



Recession
Industrial Production: Business Transit equipment (Y/Y % Change)
12 per. Mov. Avg. (Industrial Production: Business Transit equipment (Y/Y % Change))

Information Processing & Related Equipment (Y/Y % Change)

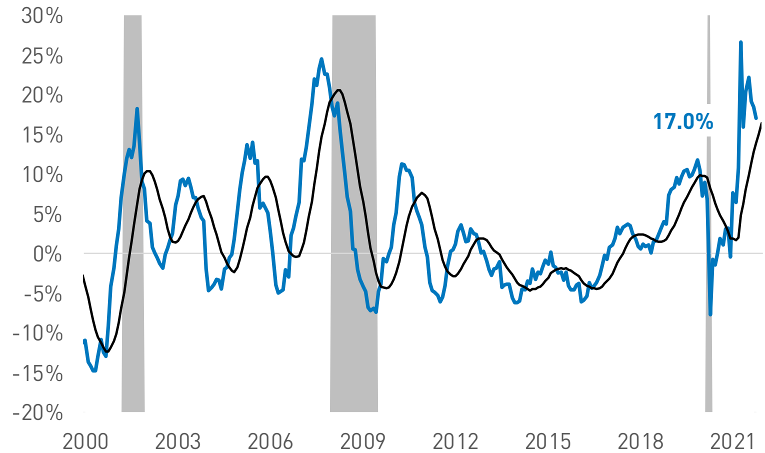


Recession
Industrial Production: Information processing and related equipment (Y/Y % Change)
12 per. Mov. Avg. (Industrial Production: Information processing and related equipment (Y/Y % Change))

Industrial & Other Equipment (Y/Y % Change)

Recession
Industrial Production: Industrial and other equipment (Y/Y % Change)
12 per. Mov. Avg. (Industrial Production: Industrial and other equipment (Y/Y % Change))

Defense & Space Equipment (Y/Y % Change)

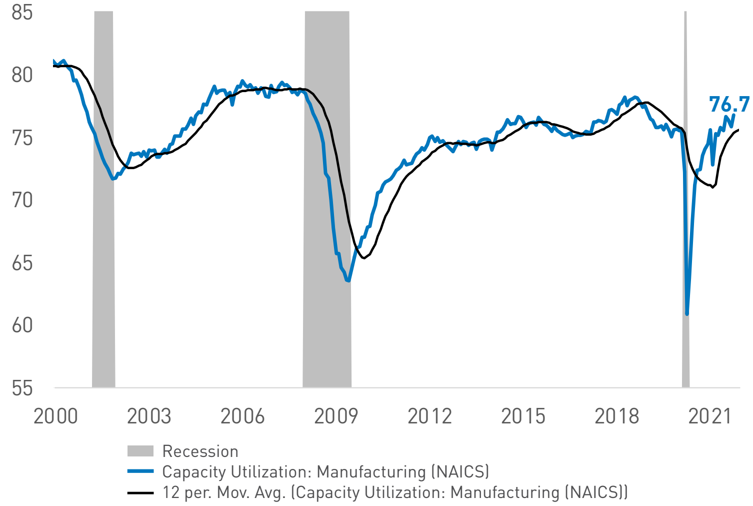


Recession
Industrial Production: Defense and space equipment (Y/Y % Change)
12 per. Mov. Avg. (Industrial Production: Defense and space equipment (Y/Y % Change))

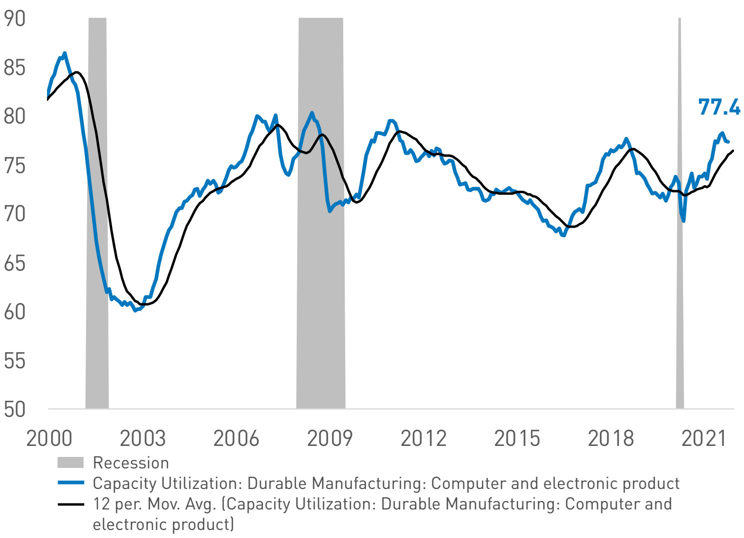
MANUFACTURING CAPACITY UTILIZATION

Overall capacity utilization improved during the month, rising to 76.4% in October. The rise in utilization rates is a hopeful sign that some of the supply chain disruptions are improving. Manufacturing capacity utilization rose to 76.7%, roughly 1.6% above pre-pandemic levels. Computer and electronic production capacity utilization fell 0.1% to 77.4% but remains 4.9% above pre-pandemic levels. Electrical equipment, appliances and components utilization fell 1.4% to 78.6%. Utilization for the motor vehicles and parts sector rose sharply, increasing 11% during the month and contributing strongly to overall utilization rates. Finally, utilization in the aerospace and miscellaneous transportation equipment sector increased 1.4% to 74.1%.

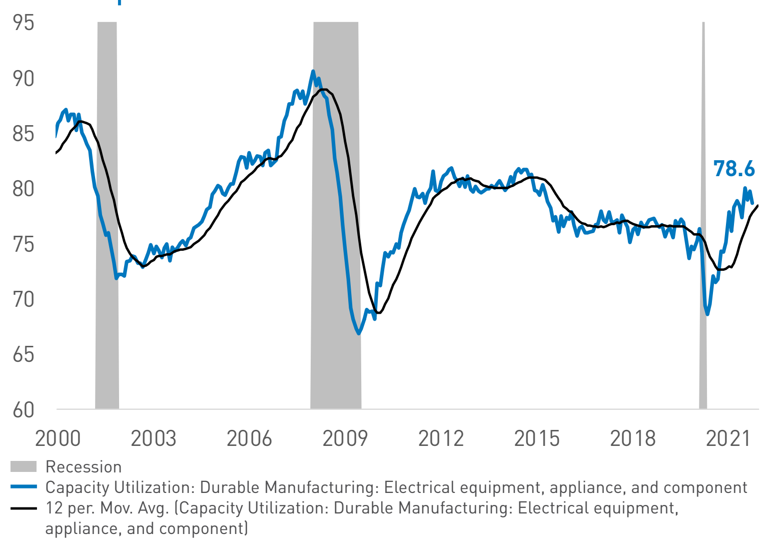
Manufacturing (NAICS)



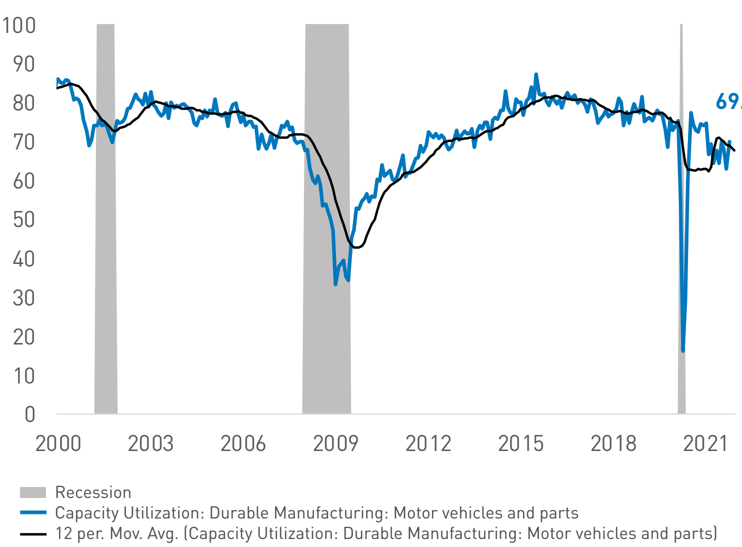
Computer & Electronic Product



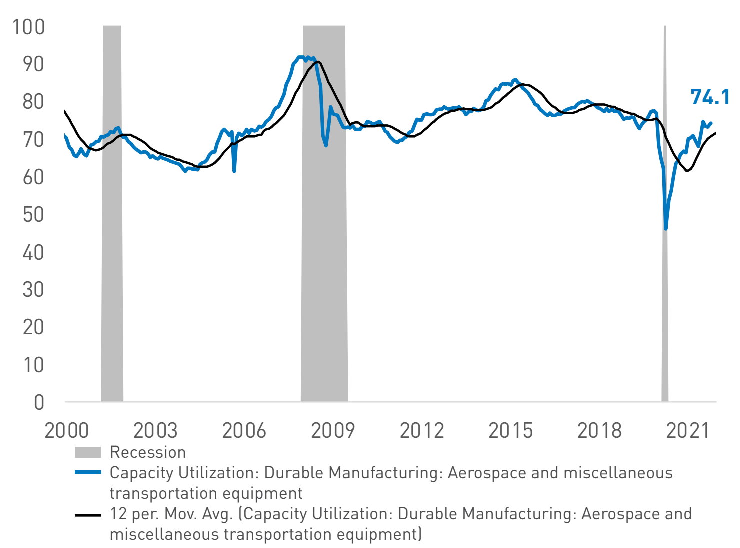
Electrical Equipment, Appliance, & Component



Motor Vehicles & Parts



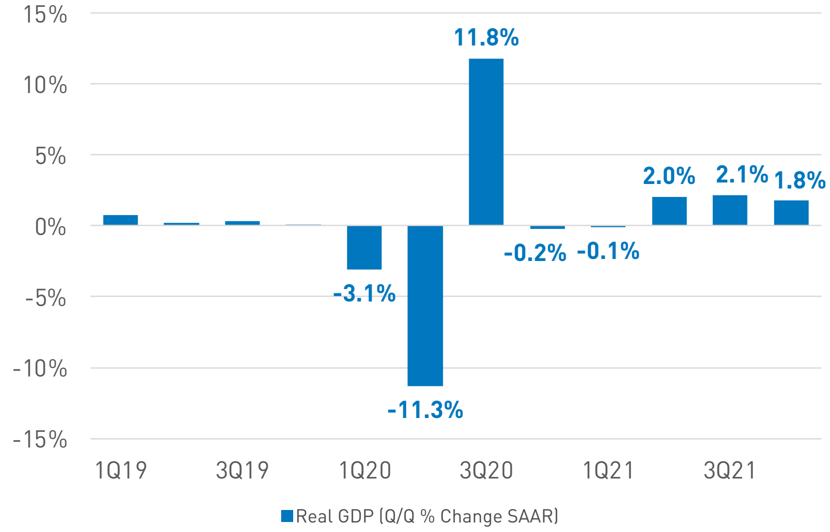
Aerospace & Miscellaneous Transportation Equipment



EUROPEAN OUTLOOK

ECONOMIC GROWTH

GDP rose 2.2% in the euro area during the third quarter (2.1% in the European Union). On an annualized basis, GDP rose 9.3% in the euro area and 8.8% in the European Union, far outpacing 2.1% GDP growth in the United States over the same period. The reemergence of COVID had stymied Europe's recovery early in the year, but Europe is quickly getting growth back on track. Growth in the third quarter was 3.7% higher than a year-ago. Growth in the third quarter was highest in Australia (3.3%), France (3%), and Portugal (2.9%).

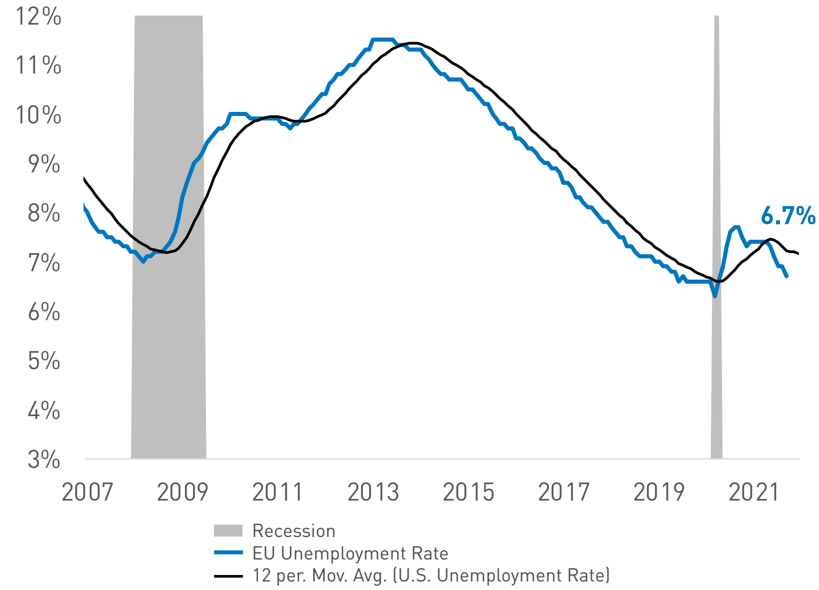


	Q/Q PERCENTAGE CHANGE				Y/Y PERCENTAGE CHANGE			
	2020Q4	2021Q1	2021Q2	2020Q3	2020Q4	2021Q1	2021Q2	2021Q3
EURO AREA	-0.4%	-0.3%	2.1%	2.2%	-4.4%	-1.2%	14.2%	3.7%
EU (27)	-0.2%	-0.1%	2.0%	2.1%	-4.1%	-1.2%	13.7%	3.9%
GERMANY	0.7%	-1.9%	1.9%	1.8%	-2.9%	-3.0%	9.9%	2.5%
FRANCE	-1.1%	0.1%	1.3%	3.0%	-4.3%	1.5%	18.8%	3.3%
ITALY	-1.7%	0.3%	2.7%	2.6%	-6.6%	-0.7%	17.0%	3.8%
SPAIN	0.2%	-0.6%	1.1%	2.0%	-8.8%	-4.2%	17.5%	2.7%

	2021 ECONOMIC GROWTH (GDP % CHANGE)	2022 ECONOMIC GROWTH (GDP % CHANGE)
EURO AREA	5.1%	4.1%
GERMANY	2.8%	4.2%
FRANCE	6.6%	4.0%
NETHERLANDS	3.9%	3.2%

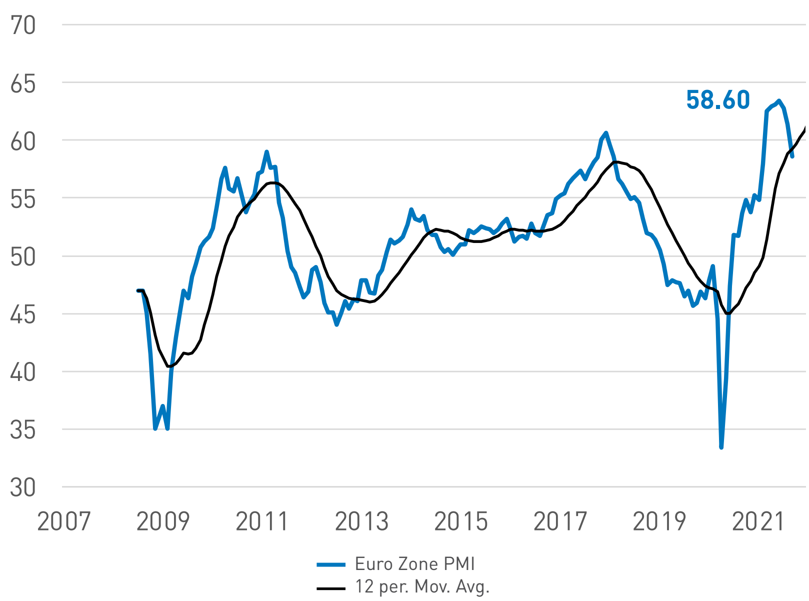
EMPLOYMENT

Unemployment declined one-tenth of a percentage point to 7.4% in September, down from 8.6% a year ago. While Europe saw a lower peak in the unemployment rate during the pandemic, the unemployment rate has remained higher than in the U.S. during the recovery. In Europe, Lithuania has seen the largest decline in unemployment over the last year. The unemployment rate has fallen from 9.9% to 6.7%. Other countries with large declines include Malta (4.7% to 3.2%), the Netherlands (4.4% to 3.1%), and Estonia (8.3% to 5.9%). As of September 2021, Czechia had the lowest unemployment rate at 2.6%, followed by the Netherlands (3.1%), Malta (3.2%), Germany (3.4%), and Poland (3.4%).



MANUFACTURERS' SENTIMENT (PMI)

Manufacturing sentiment remains high in Europe, but momentum did slow again slightly in October. The Netherlands, Ireland, and Italy all reported stronger expansions over the last month. Germany and France both reported expansions, but both countries saw manufacturing sentiment slump to a 9-month low. Supply chain dislocations continue to be the main culprit for slower growth. Like other places around the globe, long lead times, part shortages, shipping container availability, and other issues are all hindering production. Production increased during the month, but at the slowest level in the 16-months of growth. Likewise, orders expanded, but at the weakest levels since January.



E.U. END MARKETS FOR ELECTRONICS

Manufacturing output fell again in September, declining 0.4%. Manufacturing output remains up 4.8% over the last year, but is down 1.2% on a two-year basis.

COMPUTER, ELECTRONIC & OPTICAL PRODUCTS

The electronics industry, which includes categories such as components, loaded boards, computers, communications equipment and consumer electronics, saw output increase 2.6% during the month. The sector is up 30.6% over the last year and up 12.8% over the last two years.

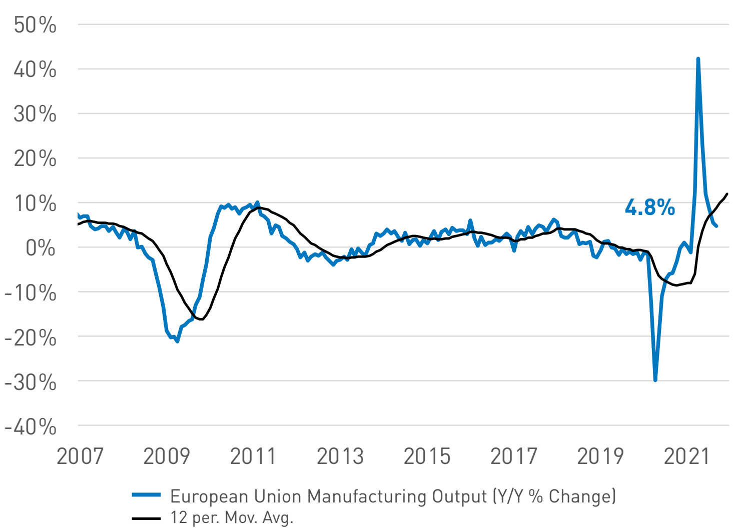
MOTOR VEHICLES

The motor vehicle manufacturing production index decreased another 1.9% in September. Auto production continues to be hampered by supply shortages. Auto production in the European Union remains off 45.2% from two years ago.

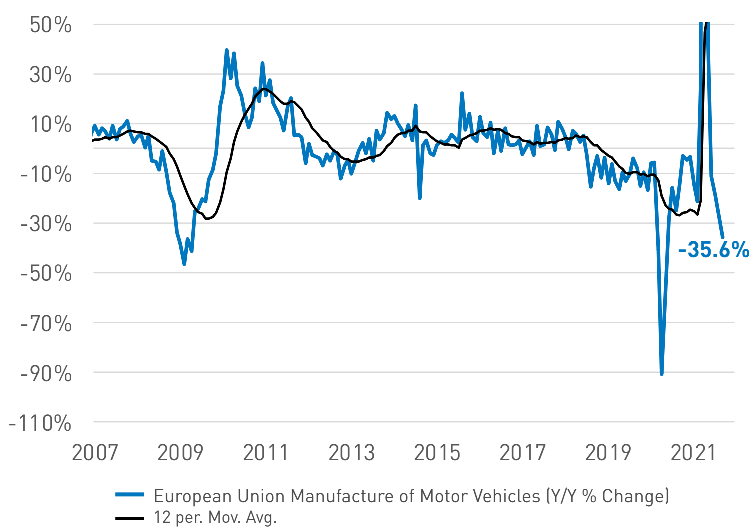
AIR & SPACECRAFT & RELATED MACHINERY

The air and spacecraft manufacturing sector declined 1% in August. The segment is down 7.5% over the last year and 29.2% over the last two years.

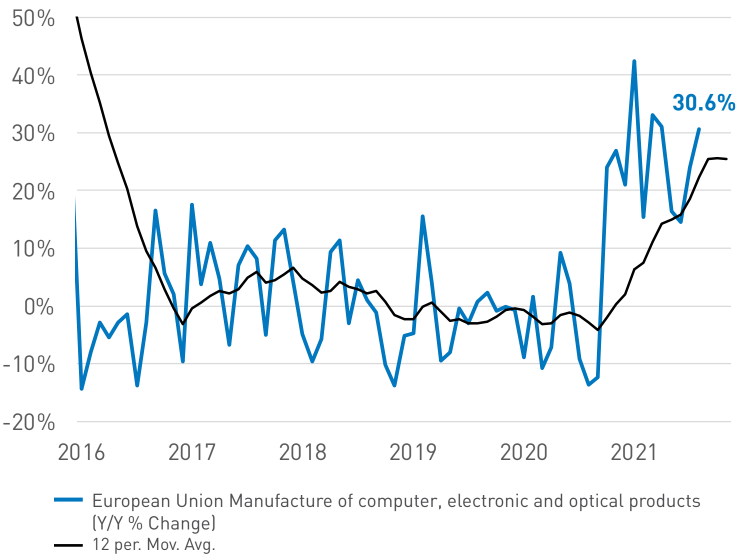
E.U. Manufacturing Output



E.U. Manufacture of Motor Vehicles



E.U. Manufacture of Computer, Electronic & Optical Products (Y/Y % Change)



E.U. Manufacture of Air & Spacecraft & Related Machinery (Y/Y % Change)